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EXAMINER

LISTVOYB, GREGORY

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/517,226
Filing Date: December 07, 2004
Appellant(s): BUSSON ET AL.

____Yonggang Ji
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on 4/10/2008 appealing from the Office action mailed on 10/09/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5288763	Li	2-1994
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5763548	Matyjaszewski	6-1998
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Fujimori et al "Effect of Viscosity in the Radical Polymerization of Acrylic Acid in the Presence of Poly(4-Vinylpyridine) in Methanol", Pol. Bull, 9, 204-207(1983)

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Issue I

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US patent 5288763) Li in combination with Matyjaszewski et al (US patent 5763548) herein Matyjaszewski and evidences by Fujimori et al Effect of Viscosity in the Radical Polymerization of Acrylic Acid in the Presence of Poly(4-Vinylpyridine) in Methanol Pol. Bull, 9, 204-207(1983), herein Fujimori

In reference to claims 1, 2, 6, 7, 12, 14, 15, Li discloses a method of producing a cross-linked polymeric support having a multimodal pore structure (Abstract) for chromatographic support material comprising the steps of:

providing a degradable template macromolecule;

providing an organic phase, which comprises 5-50% wt of template macromolecule (column 5, line 5), one or more radically polymerisable multifunctional monomers (i.e. vinyl phenol, column 3, line 20) in a solvent, and an aqueous phase, to produce a cross-linked (crosslinked with Divinylbenzene Column 4, line 20) polymeric

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support having a primary pore structure and comprising a template molecule. Then the support obtained subjects to degrading conditions to at least partially remove the template molecule from within the support to produce a cross-linked polymeric support having a secondary pore structure in addition to the primary pore structure.

Li does not positively teach that template macromolecule can initiate a polymerization, However, he teaches that the reaction can start even without any initiator (i.e. benzoyl peroxide, column 4, line 65). In addition, as evidenced by Fujimori poly(4-vinylpyridine) (used by Li as a template molecule, see Column 3, line 25) greatly increase rate of radical polymerization (see Summary), thus, effectively fulfilling the role of part of initiating system.

Specifically, Fujimori teaches that initial rate of radical polymerization of acrylic acid (AA) in the presence of poly(4-vinylpyridine) (P4VP) increases (see Introduction at page 204 and Figure 3)

Therefore, poly(4-vinylpyridine used by Li can be considered as a part of initiating system or even be a sole initiator (as in Li's case where reaction starts without any known initiator).

In addition, every known radical initiator (i.e. AIBN) is degradable.

In reference to claim 3, template molecule links with core polymer with reaction between ester or amide with acid halide (column 3, line 65).

Regarding claims 10-11 and 13-14 the template removal takes place by alkaline hydrolysis (column 5, line 45), where only ester or amide covalent bond between template and core polymer is cleaved. Therefore, the secondary pore size controlled by the molecular weight of the template.

Regarding Claims 16, 18 and 19 the final support, which has spherical particle size within the range of 3-1000 μm with macropore size of 3.5-10000 nm and microspore diameters of 0.1-3.5 nm (column 4, line 40) can be used in chromatographic separations (Abstract). Thus it inherently has specific surface area in the range of 150-300 m^2/g , which are typical values for chromatographic media.

In reference to claim 17, Lee does not teach that the polymeric support is a monolith. Monolith can be formed when all the reaction steps occur inside the column. Since Li's reaction conditions do not require high pressure and temperature, there are no technical obstacles to make Li's support inside chromatographic columns. Monolith support has extremely low backpressure, which is a very attractive feature for chromatographic separations. Therefore, it would be obvious to a person with ordinary skills in the art to prepare a monolith support using Li's process.

Li does not teach a catalyst comprising transition metal and a ligand.

Regarding claims 2, 4, 5, 8 and 9 Matyjaszewski discloses a new polymerization process, initiated by transition method (i.e. Cu, Abstract) with coordinated carbon atom (Fig. 15), which is suitable for synthesis dendritic polymers (Abstract).

Matyjaszewski's polymers have very narrow MWD =1.15, which is very desirable for chromatographic support, where uniform pores are required

Therefore, it would have been obvious to a person with ordinary skills in the art to use Matyjaszewski's initiator in Li's process in order to obtain narrow MWD and, therefore, uniform pores in the final chromatographic support.

(10) Response to Argument

Appellant submit that Li do not support the Examiner's assertion that "template macromolecule itself initiates a polymerization".

Examiner disagrees. Although Li does not positively teach that template macromolecule can initiate a polymerization, he discloses that the reaction can start even without any initiator (i.e. benzoyl peroxide, column 4, line 65).

In addition, as evidenced by Fujimori poly(4-vinylpyridine) (used by Li as a template molecule, see Column 3, line 25) greatly increase rate of radical polymerization (see Summary), thus, effectively fulfilling the role of part of initiating system. Specifically, Fujimori teaches that initial rate of radical polymerization of acrylic acid (AA) in the presence of poly(4-vinylpyridine) (P4VP) increases (see Introduction at page 204 and Figure 3). The above statement answers Appellant argument that poly(4-vinylpyridine) of Fujimori increases propagation rate of polymerization.

Appellant argues that poly(4-vinylpyridine) increased rate of propagation step, not initiating the reaction.

Examiner disagrees. Fujimori states that initial step of polymerization increases at the presence of poly(4-vinylpyridine) (see page 206). Fujimori teaches "enormous rate enhancement" at the of the above polymer.

Fujimori clearly states in the Introduction (see Introduction, last sentence, page 205) that "The initial rate of the radical polymerization of acrylic acid (AA) in the presence of poly(4-vinylpyridine) (P4VP) in methanol solution is considered..." Therefore, when Fujimori mentions rate of polymerization, he refers to its initial rate, i.e. initiation stage.

In addition, base claim 1 does not requires macromolecular initiator, claiming only degradable initiator.

Examiner points out that any initiator for radical polymerization is degradable, since it typically forms radicals.

Appellant states that the term "degradable" is defined in on page 5, lines 20-21, as "it is possible to remove by chemical or physical degradation thereof".

Examiner states that the above definition is very broad. The position is taken that any reagent can be degraded and removed by chemical or physical treatment.

Appellant argues that while Matyjaszewski gives a narrow distribution of the MW of the polymer (one of the advantages of ATRP), it would not necessarily result in a narrow pore size distribution. Appellants submit that even if one were to use Matyjaszewski's initiator in Li's process to obtain narrow MWD polymer, the pore sizes would still be dependent on the template.

Examiner disagrees. Both Li and Appellant produce a porous structure with bimodal pore distribution (macropores and micropores, see Lee Column 4, line 40 and Claim 1 of the Application). It is correct that macropores forms after template macromolecule removal (see Lee, Column 2, line 50). In opposite, pore size and pore size distribution of micropores in the polymer beads depend on polymerization conditions and molecular characteristics of the resulting polymer. Specifically, small

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molecules can be extracted from the polymer matrix (see beads preparation, Li, Example 1), whereas very large ones can prematurely precipitate from the reaction system. Therefore, preparation of uniform polymer chains is desirable in order to obtain micropores with narrow pore size distribution.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Gregory Listvoyb,

Conferees:

/James J. Seidleck/

Supervisory Patent Examiner, Art Unit 1796

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700